

# WASTE MANAGEMENT IN ROMANIA

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## ABSTRACT

*Waste constitutes a serious problem of the contemporary world, through their quantity and diversity, resulting from all economic fields, towns, services, health, and consumption activities. Integrated management of waste which is applied in Romania too, supposes the reducing wastes in productive activities, collection, transport, storage controlled, monitoring deposits and selling material or energy. This study makes references to the collection of their packaging and recycling.*

**KEYWORDS:** *waste, management, environmental protection, package, recycling*

One of the major causes of the environmental degradation and pollution is worrying emergence and growth of the quantity of wastes, which exceed the capacity of the environment to assimilate them. The meaning of "waste" is wide, including both secondary products from processing industry (processing of metals, wood, fabrics, plastics etc.), as well as various residues in the form of emissions of gases, liquids and solids from various stages of preparation, processing, use of raw materials (e.g. residue oils, burned oils of engine, sterile in preparing ores etc.). These residues do not interest immediately to be recovered economically, but they raise questions of storage in conditions that affect not in the least the ambient. Beside the production wastes, the wastes of consumption were accumulated as a result of the use and wear of products as well as the modification of their particular properties [1].

According to the Directive 2006/12/EC of the European Parliament and European Council, a "waste" is considered any substance or object that the owner eliminates it or plans, or has the obligation, to eliminate it. The concept of waste includes all categories of material presented in Table 1 [2].

## Materials and objects considered as wastes

**Table 1**

<b>Materials and objects</b>	
Q1	Residues of production or consumption, not specified in other categories
Q2	Products which do not correspond to the specifications
Q3	Expired products
Q4	Materials accidentally discharged, lost, or that have suffered other incidents, including any contaminated material, equipment etc., as a result of the incident in question
Q5	Contaminated or stained materials from scheduled action ( <i>e.g.</i> residues of the activities of dressings, packaging and containers)
Q6	Unusable parts (discharged batteries, exhausted catalysts etc.)
Q7	Substances whose performance is no longer satisfactory ( <i>e.g.</i> contaminated acids, contaminated organic solvents, exhausted salts used for mixing etc.)
Q8	Residues of industrial processes ( <i>e.g.</i> slags, distillation wastes etc.)
Q9	Residues from processes for trapping of pollutants ( <i>e.g.</i> sludge from gas trapping or from dust filters, damaged filters etc.)
Q10	Residues from mechanical processing or finishing ( <i>e.g.</i> splinters or chips from casting or lathe operations, milling slags etc.)
Q11	Residues from extraction and processing of raw materials ( <i>e.g.</i> mining residues, residues from the exploitation of oil deposits etc.)
Q12	Contaminated materials ( <i>e.g.</i> oil contaminated with PCBs etc.)
Q13	Any material, product or substance whose the use was prohibited by law
Q14	Products that may not have use for holder ( <i>e.g.</i> scrap items from agriculture, offices, shops, workshops etc.)
Q15	Contaminated materials, reagents or products resulting involved in actions for remedy the soil
Q16	Any material, product or substance which is not included in the above categories

The following types of wastes are distinguished by their origin [3], as Table 2 presents.

### The classification of wastes according their origin

**Table 2**

<b>Symbol</b>	<b>Type</b>	<b>Origin</b>
A	Municipal wastes and which are assimilated as wastes	Urban and rural
A1	Household wastes	Domestic activity, shops, hotels, restaurants, public institutions
A2	Street wastes	Street flows
A3	Wastes from construction and demolition	Construction, upgrading and maintenance including transport way
A4	Town muds from water cleaning	Stations of waste water treatment
B	Sanitary wastes	Hospitals, medical clinics
C	Processing wastes	Industrial technological processes

Symbol	Type	Origin
C1	Stock industrial wastes -class 1 -class 2 -class 3 -class 4 -class 5	Dangerous, but non toxic Non-hazardous and non toxic Inert Toxic Produced in very large quantities
C2	Agri-zootechnic wastes	Growing plants and zootechniques
C3	Special wastes	Production and use of explosives, radioactive substances

Modern society generates daily large quantities of solid, liquid or gaseous wastes. Annually, 300-800 kg waste/person is producing in the municipalities of European Union, as Table 3 shows [3].

**Quantities of municipal waste generated in several countries of the European Union  
(2007 year) according to EUROSTAT- the statistical Office of the Europe  
an Communities**

Table 3

Country	Generated wastes (kg/person)	Recycled wastes (%)	Stored wastes at garbage dumps (%)	Incinerated wastes (%)
Denmark	801	24	5	53
Ireland	786	34	64	0
UK	572	22	57	9
Germany	564	46	1	35
France	541	16	34	36
Sweden	518	37	4	47
Finland	507	26	53	12
Belgium	492	39	4	34
Greece	448	14	84	0
Romania	379	1	99	0
Czech Republic	294	2	84	13

The waste generation is dependent on the general conditions of living (tradition and education) as well as the type of economic activity. The deposits of waste are among the objectives recognized as generators on impact and risk for the environment and public health. The main forms of impact and risk determined by the deposits of municipal and industrial wastes, as they are perceived by the people, are:

- the landscape and discomfort changes;
- air pollution;
- pollution of surface waters;
- change in the soil fertility and composition biocoenoses on the surrounding lands.

Removing of the lands for waste deposits from natural or economic circuit is a process that lies along two generations at least, if considering the sum of periods of fitting out (1-3 years), operation (15-30 years), ecological restoration and post monitoring (15-20 years).

The storage of the waste means an elimination from the affected surface of a number of 30-300 biological species per hectare, without considering the microbiological population in the soil. In addition, the biocoenoses in the neighborhood near the store is modified, that meaning occurrence of dominant species of plants and animals non valuable, whereas some mammals, birds and insects leave the area.

Although effects upon flora and fauna are theoretically limited as long as the deposit is exploited, the ecological reconstruction achieved after the release of the area would not restore biological balance established initially, the biosystem developments being irreversible amended.

The most difficult problem is represented by the hazardous materials (including toxic sludge, petroleum products, residues from dye works, various metal types), which are stored in common with municipal solid waste. This situation can generate the appearance of premixtures and combinations that would be flammable, explosive or corrosive.

Many recyclable and useful materials stored together with the unrecyclable ones may be contaminated from chemically and biologically point of view, making difficult their reuse. All these considerations lead to the conclusion that the waste management requires specific measures, adequate to each phase of eliminating waste into the environment. Compliance with these measures must be subject to monitoring activity to environmental factors affected.

*The waste management* includes all activities of collection, transportation, treatment, turning to account and waste disposal, including monitoring of such operations and monitoring of waste deposits after closing them.

Among priority objectives for waste management are the preventing and reducing production of waste and reducing their dangerous degree. At the same time, it is necessary to ensure the protection of natural material and energetic resources. Achieving these objectives seeks:

- clean technology, with reduced consumption of natural resources;
- getting products that, according to the way of their manufacture, their use or their elimination, do not have an environment impact or have the smallest possible impact on the environment (that is they do not increase quantities of waste and do not generate hazardous waste);
- the removal of hazardous substances from waste destined to recovery;
- making valuable the material through the full or partial recovery of the valuable substances;
- the use of the energy waste as sources of energy again.

The community legal framework for waste management is represented by Directive No 2006 /12/eec [2]. The timing of objectives to recovery material or energy from wastes of packaging, for European operators in 2005-2013 period, is presented in Table 4 [4].

Nowadays, *Romania* is faced with serious problems related to the huge quantities of the wastes collected in time, by eliminating them in the environment in unfit conditions and their material or energy reuse in very small quantities. The Romanian *waste management* is one of the most important problems in terms of environmental impact. For instance, over 12,000 ha of territory are affected by domestic or industrial waste storage. In 2005 year [5] a number of 252 deposits of municipal waste worked, from which 18 were suitable deposits and 234 were unsuitable deposits. Also, both surface and underground waters are strongly affected by the wastes from industry, agriculture, transportation, household activities. Thus, the industry has generated in the year 2004, 355 million tons of production wastes, from which 326 million tons have proceeded from extraction activities.

## The turning to account of wastes by recycling or energy recovery

**Table 4**

Year	The minimum exploitation objective by recycling/type of material					The objective of exploitation by recycling (%)	The overall objective of recovery or incineration in the waste incineration plants, with energy recovery (%)
	Paper and card-board (%)	Plastic (%)	Glass (%)	Metal (%)	Wood (%)		
2005	-	-	-	-	-	18	22
2006	15	-	15	15	-	26	32
2007	15	10	22	15	5	28	34
2008	60	11	32	50	7	33	40
2009	60	12	38	50	9	38	45
2010	60	14	44	50	12	42	48
2011	60	16	48	50	15	46	53
2012	60	18	54	50	15	50	57
2013	60	22,5	60	50	15	55	60

For Romania, the strategic documents governing national waste management and which constitute the basic tools to ensure implementation of the European Union Policy in the Romanian waste field are the National Strategy and National Program for waste management.

*Policy priorities* in the Romania's waste management are:

- The phased closure of inconsistent deposits of municipal and industrial wastes as well as of the hospital burning ovens and the achievement of the storage capacity of hazardous wastes treated for about 110,000 tons per year;

- The development of selective collection networks and development of the integrated management of the wastes (wastes from electrical and electronic equipment, vehicles, packaging and packaging wastes etc., with simultaneously recycling of these wastes).

The Romanian Government is going to revise the national strategy in the waste management field [6], in order to elaborate, approve and monitoring the implementation of the National Program of waste management for the period 2009-2013, where two goals were added:

- ✓ correlation in financing the environment infrastructure by means of the Sectorial Program of environment;

- ✓ the use of the urban wastes in the “green” energy production and the reuse of inert industrial wastes in civil engineering and infrastructure of the transport.

Starting from 2006 year, Regional Programs for waste management were developed in Romania. The published documents promote cooperation between the district authorities and the county ones as regards the establishment and development of a system of integrated waste management, to replace the existing system that was ineffective both economically and as environmental protection. It is aiming to create in Romania a modern system for managing the waste to contribute to reducing the amount of stored wastes, to increase the environment protection and amount of useful substances or energy. In parallel, the education of population should be implemented about the selective collection (in special made places) of the garbage and waste materials from construction, as well as the participation in the special collecting programs of the wasted appliances, household wastes, wasted cars etc.

According to the community acquis, all EU states have legal obligation to collect and to use at least 60% of the quantities of packages put on the market by the producers and importers, an objective already achieved in the old Union member states. We mention that Romania has negotiated to achieve this percentage of the waste recovery until the year 2013.

The main source of financing for the implementation of environmental policy in Romania is represented by "Environment" POS, which is a Sectorial Operational Program [7]. The Community sources used in implementing Environment POS are assured of the Cohesion Fund and the European Fund for Regional Development. In this regard, 882 million euros from the budget of this POS for environment for the period 2007-2013 were allocated for "Development of integrated waste management systems and rehabilitation of contaminated sites" Project which is considered one of the priorities.

In the present paper, the usage of the packages by Eco-Rom Packages S.A. company was studied. The company has contributed to recycling in the period 2004-2008 to 840,000 tons of waste packages, of which: 408,203.39 tons were waste paper or cardboard, 144,205.61 tons were bottles, 127,505.23 tons were plastics, 121,404.55 tons were metals and 36,794.48 t were wood wastes.

The origin of packaging indicated the following sources: 65% came from food and beverage suppliers, 13% from industry of building materials, 7% from chemical industry, 2% from tobacco industry, 2% from plastic materials companies, 2% from cosmetics, 1% from electrical /electronic products as manufactured home appliances, 2% from pulp and paper industries, 2% from shopping centers chains, 1% from pharmaceutical industry and 3% from other industrial suppliers.

Only in 2008 year, 745,000 tons of packages, consisted in: 5% metals, 22% wood, 18 % glass, 30% plastics and 25% paper or cardboard have been reintroduced on the market by the above mentioned company.

It is worth to mention that the profits for the environment are very important. For example, only by using paper and board around 1 million tons of wood were estimated to be saved, this meaning 7 million trees rescued. Also, by selling recycled plastics around a quantity of 95,000 tons of functional crude oil was saved. The company has built its own infrastructure of selective collection of materials. Thus, the packaging wastes are collected, transported, processed and recycled in conditions which are not dangerous for human health and environment. The industry is encouraged to develop its capacities of recycling on national territory. Also, the transport costs are optimized by delivering the recovered materials to the proximity firms from the respective area.

### Conclusion

We consider that the integrated management of wastes in Romania is a beginning field. The legislation is established under Directive of the European Parliament and of the Council and our Government has to implement it more rapidly. We see that Romania reported annual level of environmental indicators, but there are serious problems with reducing quantities of wastes, their controlled storing, the reuse of the substances for their energy content and value, as well as the deposit monitoring.

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